

Listing of Claims:

Claim 1. (Previously Presented) A method of determining an implementation of a user design on a programmable device including a plurality of programmable logic elements, each comprising reconfigurable logic hardware and fixed-configuration secondary hardware; the fixed-configuration secondary hardware having a plurality of inputs, the inputs common to at least two of the programmable logic elements, the method comprising:

determining a plurality of assignments for each of a plurality of portions of the user design using the fixed-configuration secondary hardware of a programmable logic element;

ranking the plurality of assignments by determining a number of times each of a plurality of signals in the user design is assigned as one of the plurality of inputs to the fixed-configuration secondary hardware; and

selecting the highest ranked assignment, where a first signal in the plurality of signals in the user design is assigned as a first input of the plurality of inputs to the fixed-configuration secondary hardware more than other signals in the plurality of signals in the user design are assigned to an input to the fixed-configuration secondary hardware; and

implementing the user design by implementing the first signal as the first input of the plurality of inputs to the fixed-configuration secondary hardware.

Claim 2. (Previously Presented) The method of claim 1, wherein each of the plurality of assignments defines an assignment of at least one input variable of the user design to an input of the fixed-configuration secondary hardware.

Claim 3. (Original) The method of claim 1, wherein the fixed-configuration secondary hardware enables load and clear functions of a register of the programmable device.

Claim 4. (Previously Presented) The method of claim 1, wherein each of the plurality of assignments is associated with at least one register of the user design.

Claim 5. (Previously Presented) The method of claim 4, wherein ranking the plurality of assignments includes determining the number of registers of the user design associated with each of the plurality of assignments.

Claim 6. (Previously Presented) The method of claim 5, wherein selecting the highest ranked input assignment includes selecting the assignment with the most associated registers from the plurality of assignments.

Claim 7. (Previously Presented) The method of claim 4, comprising disassociating at least one register from at least one of the plurality of assignments, wherein the disassociated register is associated with the selected assignment.

Claim 8. (Previously Presented) The method of claim 1, comprising removing the selected assignment from the plurality of assignments, thereby forming a subset of the plurality of assignments.

Claim 9. (Previously Presented) The method of claim 8, comprising evaluating a criteria for the subset of the plurality of assignments; and
in response to a determination that the criteria exceeds a threshold, reiterating the steps of determining a plurality of assignments, ranking the plurality of assignments, and selecting the highest ranked input assignment for the subset of the plurality of assignments.

Claim 10. (Previously Presented) The method of claim 2, wherein determining a plurality of assignments comprises:
enumerating a plurality of sets of input variables associated with the portion of the user design; and
creating a plurality of assignments from at least a portion of the sets of input variables.

Claim 11. (Previously Presented) The method of claim 10, further comprising:

creating a logic diagram describing the function of each of the plurality of sets of input variables; and

determining from the logic diagram whether the function of each of the plurality of sets of input variables corresponds with at least one function of the fixed-configuration secondary hardware.

Claim 12 (Original) The method of claim 11, wherein the logic diagram is a truth table.

Claim 13. (Original) The method of claim 11, wherein the logic diagram is a Karnaugh map.

Claim 14. (Previously Presented) The method of claim 11, wherein creating a plurality of assignments comprises applying at least one heuristic to each of the plurality of sets of input variables having a function corresponding with at least one function of the fixed-configuration secondary hardware, thereby determining at least one corresponding assignment.

Claim 15. (Original) The method of claim 10, wherein enumerating a plurality of sets of input variables includes using cut enumeration.

Claims 16-19. (Cancelled)

Claim 20. (Previously Presented) An information storage medium including a set of instructions adapted to operate an information processing device to perform a set of steps to implement a user design on an integrated circuit, the integrated circuit comprising a plurality of programmable logic elements, each comprising fixed-configuration secondary hardware, the set of steps comprising:

determining a plurality of assignments for each of a plurality of portions of the user design using the fixed-configuration secondary hardware of a programmable logic element;

ranking the plurality of assignments by determining a number of times each of a plurality of signals in the user design is assigned as one of the plurality of inputs to the fixed-configuration secondary hardware; and

selecting the highest ranked assignment, where a first signal in the plurality of signals in the user design is assigned as a first input of the plurality of inputs to the fixed-configuration secondary hardware more than other signals in the plurality of signals in the user design are assigned to an input to the fixed-configuration secondary hardware; and

implementing the user design by implementing the first signal as the first input of the plurality of inputs to the fixed-configuration secondary hardware.

Claim 21. (Previously Presented) The information storage medium of claim 20, wherein each of the plurality of assignments defines an assignment of at least one input variable of the user design to an input of the fixed-configuration secondary hardware.

Claim 22. (Original) The information storage medium of claim 20, wherein the fixed-configuration secondary hardware enables load and clear functions of a register of the programmable device.

Claim 23. (Previously Presented) The information storage medium of claim 20, wherein each of the plurality of assignments is associated with at least one register of the user design.

Claim 24. (Previously Presented) The information storage medium of claim 23, wherein ranking the plurality of assignments includes determining the number of registers of the user design associated with each of the plurality of assignments.

Claim 25. (Previously Presented) The information storage medium of claim 24, wherein selecting the highest ranked input assignment includes selecting the assignment with the most associated registers from the plurality of assignments.

Claim 26. (Previously Presented) The information storage medium of claim 23, comprising disassociating at least one register from at least one of the plurality of assignments, wherein the disassociated register is associated with the selected assignment.

Claim 27. (Previously Presented) The information storage medium of claim 20, comprising removing the selected assignment from the plurality of assignments, thereby forming a subset of the plurality of assignments.

Claim 28. (Previously Presented) The information storage medium of claim 27, comprising evaluating a criteria for the subset of the plurality of assignments; and
in response to a determination that the criteria exceeds a threshold, reiterating the steps of determining a plurality of assignments, ranking the plurality of assignments, and selecting the highest ranked input assignment for the subset of the plurality of assignments.

Claim 29. (Previously Presented) The information storage medium of claim 21, wherein determining a plurality of assignments comprises:
enumerating a plurality of sets of input variables associated with the portion of the user design; and
creating a plurality of assignments from at least a portion of the sets of input variables.

Claim 30. (Previously Presented) The information storage medium of claim 29, further comprising:
creating a logic diagram describing the function of each of the plurality of sets of input variables; and
determining from the logic diagram whether the function of each of the plurality of sets of input variables corresponds with at least one function of the fixed-configuration secondary hardware.

Claim 31 (Original) The information storage medium of claim 30, wherein the logic diagram is a truth table.

Claim 32. (Original) The information storage medium of claim 30, wherein the logic diagram is a Karnaugh map.

Claim 33. (Previously Presented) The information storage medium of claim 30, wherein creating a plurality of assignments comprises applying at least one heuristic to each of the plurality of sets of input variables having a function corresponding with at least one function of the fixed-configuration secondary hardware, thereby determining at least one corresponding assignment.

Claim 34. (Original) The information storage medium of claim 29, wherein enumerating a plurality of sets of input variables includes using cut enumeration.

Claim 35. (Cancelled)

Claim 36. (Previously Presented) A method of implementing a user design on an integrated circuit, the user design comprising a plurality of logic gates and a plurality of registers, the integrated circuit comprising a plurality of programmable logic elements, each programmable logic element comprising a register and a plurality of logic gates having a plurality of inputs, the method comprising:

for each register in the plurality of registers in the user design:

determining a logic representation for at least one logic gate having a plurality of inputs, the at least one logic gate coupled to the input of the register in the user design;

determining at least one way to implement the logic representation using the plurality of logic gates in a programmable logic element; and

assigning input signals to the at least one logic gate of the user design to inputs of the logic gates in the programmable logic element; then

for each input signal in a plurality of input signals to the logic gates coupled to input of registers in the user design:

determining a number of occurrences where the input signal is assigned to an input of the logic gates in a programmable logic element; and

determining a first input signal and first input of the logic gates in the programmable logic elements where the first input signal is assigned to the first input more than other input signals are assigned to an input of the logic gates in the programmable logic elements; then

implementing the user design on the integrated circuit by implementing the first input signal as the first input of the logic gates in the programmable logic elements.

Claim 37. (Previously Presented) The method of claim 36 wherein the logic gates provide load and clear functions for the register in a programmable logic element.